



## **Disagreements in low-level moisture between (re)analyses over summertime West Africa**

Alexander Roberts (1), John Marsham (1), and Peter Knippertz (2)

(1) Institute of Climate and Atmospheric Science, University of Leeds, Leeds, UK, (2) Institute of Meteorology and Climate Research, Tropospheric Research, Karlsruhe Institute of Technology, Karlsruhe, Germany

Reanalysis and operational analysis products are routinely used as the best estimates of the atmospheric state for operational and research purposes. However, different models, assimilation techniques, and assimilated datasets lead to differences between products. Here, such differences in the distribution of low-level water vapor over summertime West Africa are analyzed, as reflected in the zonal mean position of the leading edge of the West African monsoon.

Five reanalysis products (NCEP–NCAR, NCEP–DOE, MERRA, CFSR and ECMWF ERA-Interim) and two operational analyses (GFS and ECMWF) are studied over 11 monsoon seasons (2000 to 2010).

Specific humidity differences regularly reach 50% of the mean value over areas spanning hundreds of kilometers and often coincide with northward excursions of the ITD. These events can last several days and bring unusual rainfall to the Sahel and Sahara. The retreat phase of the monsoon excursions coincides with the peak disagreement between the ensemble of (re)analysis products and are connected with anomalously high values of aerosol optical depth (AOD). The rainfall patterns and presence of high AOD anomalies are consistent with the production of haboob dust storms. This suggests that known errors in the representation of moist convection and cold pools may contribute to the identified disagreements.

Disagreement between products was lowest in 2006. During this monsoon season upper-air observations were enhanced as part of the African Monsoon Multidisciplinary Analysis (AMMA) campaign. This points to insufficient observational constraint of the (re)analyses that was greatly improved in 2006. It is hoped that this work will raise awareness of the limited reliability of (re)analysis products over West Africa during the summer, particularly during northward surges of the ITD, and will instigate further work to improve their quality.